

REMARKS

The Applicant acknowledges that the corrected drawings have been received and accepted by the Examiner.

Claims 1-56 are currently pending in the application. Claims 1, 15, 19, 30, 40, 45, 46, and 51 are independent claims.

Applicant acknowledges and appreciates that the rejections in the previous Office Action have been found to be persuasive and have been withdrawn. Applicant responds to the rejections in the current Office Action below.

The Examiner rejected claims 1-56 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,714,473 (*Fiscus*), as supported by U.S. Patent No. 6,154,408 (*Yuh*) and U.S. Patent No. 6,304,148 (*Nomura*). Applicant respectfully traverses this rejection.

The Examiner cited *Fiscus* to reject various claims of the present invention. *Fiscus* is directed to monitoring the voltage of a memory cell 110 to affect a refresh process. *Fiscus* provides a charge leakage detector and a discharge leakage detector that produces the signals V_0 and V_1 , respectively. These signals represent the storage node voltages of memory cells in a memory array 106. See column 2, lines 51-66. *Fiscus* explicitly focuses on the voltages falling below a reference level and asserting a leakage current "LEAKHI". See column 5, lines 40-51. Similarly, *Fiscus* discloses that if the voltage V_0 rises above the reference voltage V_{LO} , a signal "LEAKLO" activates a refresh operation. *Id.* Therefore, *Fiscus* is directed to monitoring the leakage in terms of the voltage of a memory element to effect memory refresh control. In contrast, claims of the present invention are directed to the current leakage approximation to effect the refresh rate control. For example, claim 1 calls for a circuit for performing an

approximation of a current leakage associated with a portion of the device and affecting the refresh rate associated with a portion of the device. *Fiscus* mentions absolutely no approximation of a current leakage. *Fiscus* merely compares a voltage level to a reference voltage to assert a signal to effect the refresh operation. *Fiscus* is clearly devoid of the approximation of the current leakage. Therefore, contrary to the Examiner's assertion, *Fiscus* does not disclose a circuit for performing an approximation of a current leakage; and the Examiner has failed to point out any disclosure in *Fiscus* to support such an assertion. As described above, *Fiscus* is generally directed to voltage comparisons and not current leakage. Further, *Fiscus* simply does not perform any type of approximation of current leakage.

Further, the supporting prior art *Yuh* and *Numura* do not make up for this deficit. Additionally, the Examiner seems to be asserting various prior art references in one rejection in a 103 obviousness style rejection under the heading of an anticipation rejection under 35 USC 102(e). However, as described below, even the inclusion of *Yuh* and *Numura* does not make up for the deficit of *Fiscus*. *Numura* refers to controlling refresh cycles in light of rising temperatures, however, *Numura* does not anticipate approximating a current leakage and adjusting a refresh cycle. Further, *Yuh* does not disclose any structure or method for approximating any type of a current leakage. Further, claim 1 also calls for a refresh rate control unit to adjust a refresh rate associated with a portion of a device in response to the approximation of the leakage current. *Yuh* does not disclose adjusting the refresh rate. Further, *Yuh* does not disclose any type of a refresh rate control based upon any type of an approximation of current leakage. *Yuh* is directed to sensing a voltage potential and generating a right operation control signal performed by a self-refresh isolator.

Yuh discloses that the self-refresh oscillator includes a control signal generator that senses a variation of a signal inputted into a comparator. *See* column 2, lines 62-64. The control signal generator 14 of *Yuh* also generates a write operation that has a predetermined pulse width to enable an operation when a self-refresh mode starts. *See* column 2, lines 64-67. This is performed to control a waveform of an output signal by controlling a pulse width of the output signal and varying a refresh period, and *not* the refresh rate, as called for by claims of the present invention. *See* column 3, lines 10-15.

The Examiner mistakes the cell-emulation unit 21 of *Yuh* to be a current leakage model circuit. The cell emulation unit simply senses cell data loss that may result from leakage current, but does not detect or approximate leakage current. *See* column 3, lines 22-28. Specifically, the emulation unit is described to detect the voltage level. *See* column 3, lines 29-39. Therefore, *Yuh* is directed to enabling the write operation when a self-refresh mode starts. It does not adjust the refresh rate.

The output signal (of the cell emulation unit) disclosed by *Yuh* is related to varying the refresh period but not the refresh rate. Further, there is no disclosure in *Yuh* that suggests or discloses approximating the current leakage. In contrast to *Yuh*, claims of the present invention are directed to approximate current leakage and adjust a refresh rate in response to the approximation of the current leakage. *Yuh* makes no correlation between any type of a refresh rate and an approximation of a current leakage. Simply disclosing that sensing a cell data loss is detected wherein the cell data loss may result from current leakage does not equate to approximating the current leakage. Claims of the present invention are directed to approximating the current leakage and then adjusting a refresh rate, which is clearly not anticipated or suggested by *Yuh*. Therefore, claim 1 of the present invention is not taught,

disclosed, or suggested by *Yuh*. Accordingly, claim 1 of the present invention is allowable for at least the reasons cited herein.

Further, the Examiner has failed to point out the specific citation in *Yuh* and *Numura* to support his assertion that these prior art references support the allegation that *Fiscus* anticipates claims of the present invention. Clearly, neither *Yuh* nor *Numura* disclose performing an approximation of the leakage current and affecting a refreshing rate control based upon the approximation. And as described above, *Fiscus* clearly does not anticipate all of the elements of any claim of the present invention. Therefore, claim 1 of the present invention is allowable.

Independent claim 15 calls for a cell leakage model to model a current leakage and a refresh control isolator to control the refresh rate and a delay unit for controlling the refresh rate. Clearly, as described above, nothing in *Fiscus*, *Yuh* and/or *Numura* discloses modeling a current leakage and adjusting a refresh rate. Therefore, claim 15 of the present invention is allowable for at least the reasons cited herein.

Further, claim 19 calls for a system board that includes a memory device, which includes a leakage model circuit for approximating a current leakage and a refresh rate control unit for adjusting the refresh rate based upon the approximation of the current leakage, which are elements not taught, disclosed, or suggested by *Fiscus*, *Yuh* and/or *Numura* for at least the reasons cited above. Therefore, claim 19 of the present invention is allowable for at least the reasons cited herein.

Further, claim 30 calls for a memory device that comprises a leakage model circuit for approximating a current leakage and a refresh rate control unit for adjusting the refresh rate based upon the approximation of the current leakage, which are elements not taught, disclosed,

or suggested by *Fiscus*, *Yuh* and/or *Numura* for at least the reasons cited above. Therefore, claim 30 of the present invention is allowable for at least the reasons cited herein.

Claim 40 calls for a method for detecting a change in a current leakage and adjusting the refresh rate based upon the current leakage, which as described above, is not taught, disclosed, or suggested by *Fiscus*, *Yuh* and/or *Numura*. Therefore, claim 40 of the present invention is also allowable.

Further, claim 45 calls for a means for detecting a current leakage and means for adjusting the refresh rate based upon the current leakage which, as described above, are not elements that are taught, disclosed, or suggested by *Fiscus*, *Yuh* and/or *Numura*. Therefore, claim 45 of the present invention is allowable.

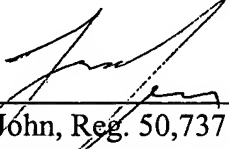
Additionally, claim 46 calls for a computer readable program device that, when executed by a computer, performs a method that includes detecting a change in the leakage current and adjusting the refresh rate, which, as described above, are elements not taught, disclosed, or suggested by *Fiscus*, *Yuh* and/or *Numura*. Therefore, claim 46 of the present invention is also allowable.

Independent claims 1, 15, 19, 30, 40, 45, and 46 are not taught, disclosed, or suggested by the prior art for at least the reasons cited herein. Additionally, dependent claims 2-14, 16-19, 31-39, 41-44, and 46-56, which respectively depend from claims 1, 15, 19, 30, 40, and 46, are also allowable for at least the reasons cited herein.

Reconsideration of the present application is respectfully requested.

In light of the arguments presented above, Applicant respectfully asserts that claims 1-56 are allowable. In light of the arguments presented above, a Notice of Allowance is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Houston, Texas telephone number (713) 934-4069 to discuss the steps necessary for placing the application in condition for allowance.

Date: <u>December 18, 2006</u>	<p>Respectfully submitted,</p> <p>WILLIAMS, MORGAN & AMERSON, P.C. CUSTOMER NO. 23720</p> <p>By: </p> <p>Jaison C. John, Reg. 50,737 10333 Richmond, Suite 1100 Houston, Texas 77042 (713) 934-4069 (713) 934-7011 (facsimile) ATTORNEY FOR APPLICANT(S)</p>
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